A Mosquito Taxonomic Glossary

VI. Female Genitalia*

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For a full explanation of this project see Part I (Knight 1970). As before, terms recommended for standardized use are given fully capitalized. Synonyms or terms used in error are in lower case and underlined. Standardized abbreviations are also suggested. An appendix presenting reasons for the recommendation of terms not presently in common use is given.

As before, we wish to acknowledge the provision by Dr. H. C. Chapman of the adult mosquito specimens used for the drawings. The drawings were prepared by Mrs. Yvonne Lee. Dr. Wayne Rowley provided live females of Aedes aegypti (L.) for study and Mr. J. Ackland Jones pointed out some relevant literature.

Readers are reminded that this is a preliminary presentation and that, when all the parts are completed, they will be thoroughly revised and issued under a single cover. Because of this, all individuals interested in mosquito systematics are urged to comment fully on any portion of the included text when they feel this is necessary.

Part V of this series dealt with terms for the abdomen except the female genitalia (Knight and Laffoon 1971).

anterior cowl. - See UPPER VAGINAL LIP.

atrial plate. - See VAGINAL SCLERITE.

atrium. - See VAGINA.

capsula seminalis. - See SEMINAL CAPSULE.

CERCUS (Ce). - In female mosquitoes, a pair of more or less conspicuous dorsal lobes posterior to the ninth tergum; appendages of the proctiger. Also, confer PARAPROCT (in section on male genitalia, Knight and Laffoon 1971).

cowl. - See UPPER VAGINAL LIP and confer cowl in the appendix.

ductus receptaculi. - See SPERMATHECAL DUCT.

genital chamber. - See VAGINA.

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genital lip. - See VAGINAL LIP.

GONOPORE (Gp). - In arthropods, any opening from a mesodermal or ectodermal gonoduct which functionally extends it. In female mosquitoes, the term is most commonly used for the opening between the common oviduct and the vagina.

GONOTREME (Go). - The posterior opening of the vagina. In female mosquitoes, bounded by the genital lips.

hinge. - In female mosquitoes, used by Coher (1948,78) for the point of articulation between the upper and lower vaginal lips.

INSULA (I). - In some female mosquitoes, a median, usually enlarged and setose portion of the lower vaginal lip, often oriented differently than adjacent parts of the lip and connected with them by weakly sclerotized areas. (Syn.: insula plate, insular plate.)

insula plate. - See INSULA.

insular plate. - See INSULA.

LOWER VAGINAL LIP (LVL). - In female mosquitoes, the semicircular eighth sternite which forms the rim of the floor of part of the vagina, articulated with the upper vaginal lip at the hinge. (Syn.: preatrial sclerite, sigma of most authors.)

periatrial sclerite. - See VAGINAL LIP.

postatrial plate. - See VAGINAL SCLERITE.

postatrial sclerite. - See UPPER VAGINAL LIP.

posterior sigma. - See UPPER VAGINAL LIP.

POSTGENITAL LOBE. - In female Nematocera, the median ventral lobe of the postgenital segments, usually extended ventrally under the anus; often entirely membranous, sometimes bearing a postgenital plate or plates.

POSTGENITAL PLATE (PgP). - In female Nematocera, a sclerite of the distal part of the postgenital lobe, thus presumably an 11th sternite. In mosquitoes, usually one weak sclerite covers much of the postgenital lobe.

preatrial sclerite. - See LOWER VAGINAL LIP.

PROCTIGER (Pr). - See definition in section on male genitalia. (Knight and Laffoon 1971).

receptaculum seminis. - See SPERMATHECA and SEMINAL CAPSULE.

SEMINAL CAPSULE (SCa). - Any one of the one to four enlarged reservoirs often differentiated at the inner end or ends of the spermatheca or spermathecae; usually functional in semen storage. In mosquitoes, 1-3 present, typically spherical and with darkly pigmented cuticle. (Syn.: capsula seminalis; receptaculum seminis of some authors; spermatheca of many authors, including many mosquito taxonomists; spermatotheca; theca.)

sigma. - See LOWER VAGINAL LIP.

SPERMATHECA (Spt). - In most female insects, the usual seminal storage organ, a posteroventral ectodermal caecum of the 8th abdominal segment just behind the common oviduct, attached to the anterodorsal end of the vagina if the latter is developed; usually single but up to 4 sometimes present. In mosquitoes, 1, 2 or 3 spermathecae present. Confer SEMINAL CAPSULE and SPERMATHECAL DUCT. (Syn.: receptaculum seminis of many authors.)

SPERMATHECAL DUCT (SDu). - In many female insects, a duct between a spermathecal aperture and a seminal capsule; sometimes one duct or part of one serves more than one seminal capsule. (Syn.: ductus receptaculi.)

SPERMATHECAL EMINENCE (SE). - In some female Diptera, a median projection extending into the vagina from its roof just behind the gonopore and bearing the apertures of the spermathecae and accessory gland. (Syn.: spermathecal tubercle, spermatothecal eminence, tuberculum spermathecale.)

spermathecal tubercle. - See SPERMATHECAL EMINENCE.

spermatotheca. - See SEMINAL CAPSULE.

spermatothecal eminence. - See SPERMATHECAL EMINENCE.

theca. - See SEMINAL CAPSULE.

tuberculum spermathecale. - See SPERMATHECAL EMINENCE.

UPPER VAGINAL LIP (UVL). - In female mosquitoes, the ninth sternite which forms the rim of the roof of the posterior part of the vagina, articulated with the lower vaginal lip anteriorly at the hinge. (Syn.: cowl of Christophers 1923, Edwards 1941, and some other authors; postatrial sclerite; posterior sigma.)

VAGINA (Va). - In most female insects, an ectodermal pouch derived from the posteroventral part of abdominal segment 8 (possibly 9 in some insects) and sometimes adjacent parts of the abdominal venter, ending anteriorly at the posterior end of the common oviduct. In mosquitoes and some other insects, the roof of the pouch is formed by the venter of abdominal segment 9 and the pouch is partially divided transversely by the spermathecal eminence. (Syn.: atrium of many authors on Nematocera, genital chamber of many authors.)

VAGINAL LIP. - Either of the lips forming the rims of the roof and floor of the posterior end of the vagina; sclerotized in mosquitoes. Confer LOWER GENITAL LIP and UPPER GENITAL LIP. (Syn.: periatrial sclerite, vaginal lip.)

VAGINAL SCLERITE (VS). - In Diptera, any sclerite of the vaginal roof other than the upper vaginal lip, sometimes a vaginal sclerite and the lip are continuous and are distinguishable by position only. (Syn.: atrial plate, postatrial plate.)

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ABBREVIATIONS

Ce	-cercus	SCa	-seminal capsule
Go	-gonotreme	SDu	-spermathecal duct
Gp	-gonopore	SE	-spermathecal eminence
I	-insula	Spt	-spermatheca
LVL	-lower vaginal lip	UVL	-upper vaginal lip
PgP	-postgenital plate	Va	-vagina
Pr	-proctiger	VS	-vaginal sclerite

EXPLANATION OF FIGURES

Fig. 31

a. Aedes (Ochlerotatus) grossbecki Dyar and Knab. Lateral aspect of terminal female abdominal segments.

b. Culex (Neoculex) territans Walker. Lateral aspect of terminal female abdominal segments.

c. Culex (Culex) pipiens L. Ventral aspect of terminal female abdominal segments.

d. Aedes (Ochlerotatus) vigilax ludlowae (R. Blanchard). Ventral aspect of terminal female abdominal segments.

e. Aedes (Finlaya) varipalpus (Coquillett). Ventral aspect of terminal female abdominal segments. Vagina opened with lower vaginal lip drawn forward (left unsymmetrical just as opened).

Fig. 32

a. Aedes aegypti (L.). Composite schematic lateral view of interior of the terminal female abdominal segments. (Redrawn in modified form from Jones and Wheeler 1965.)

b. A. aegypti. Semi-diagrammatic ventral view of the terminal female abdominal segments. The vaginal lips are opened. The bursal orifice and accessory gland have been enlarged for clarity. (Redrawn from Jones and Wheeler 1965.)

Fig. 31

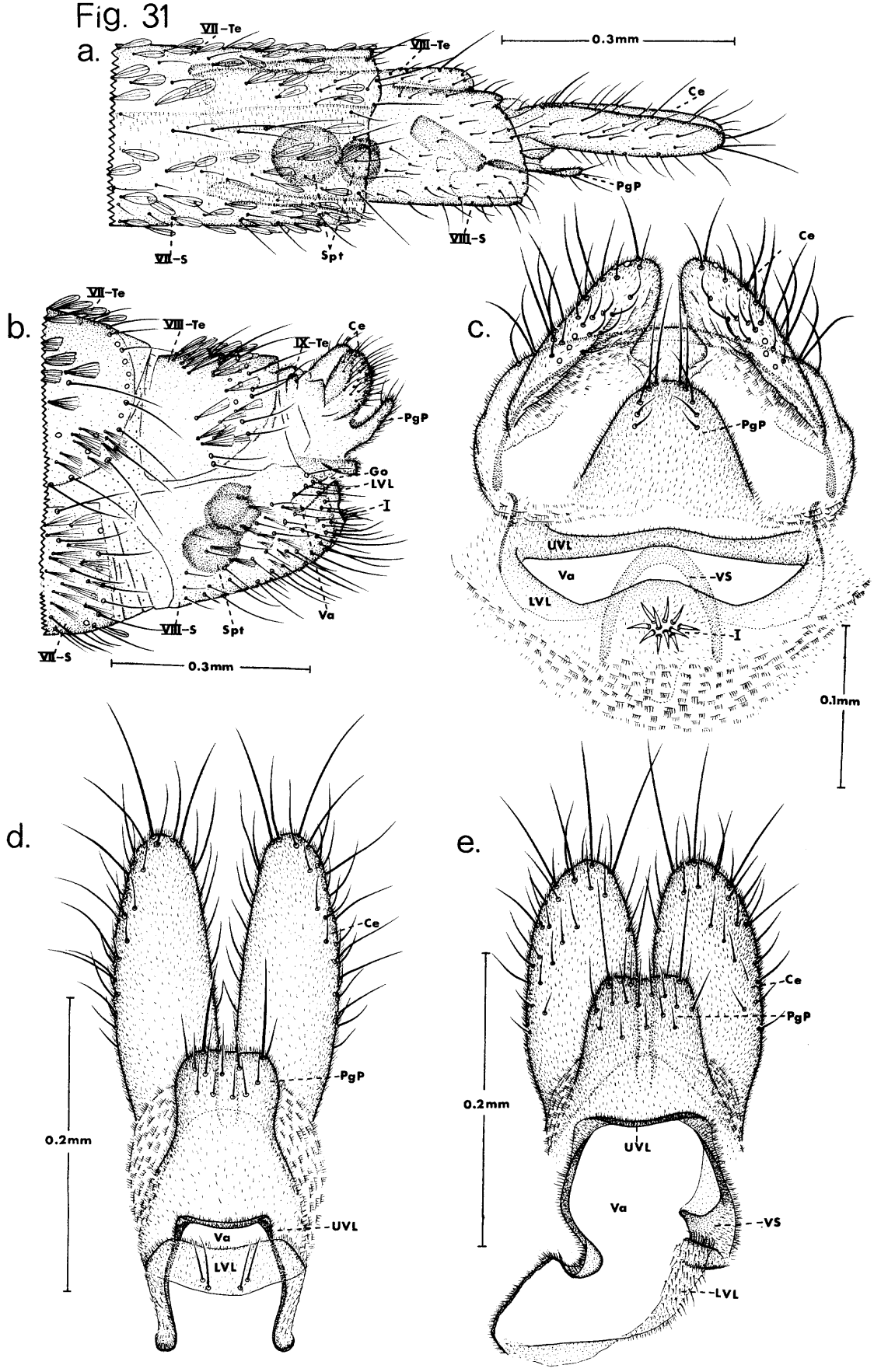
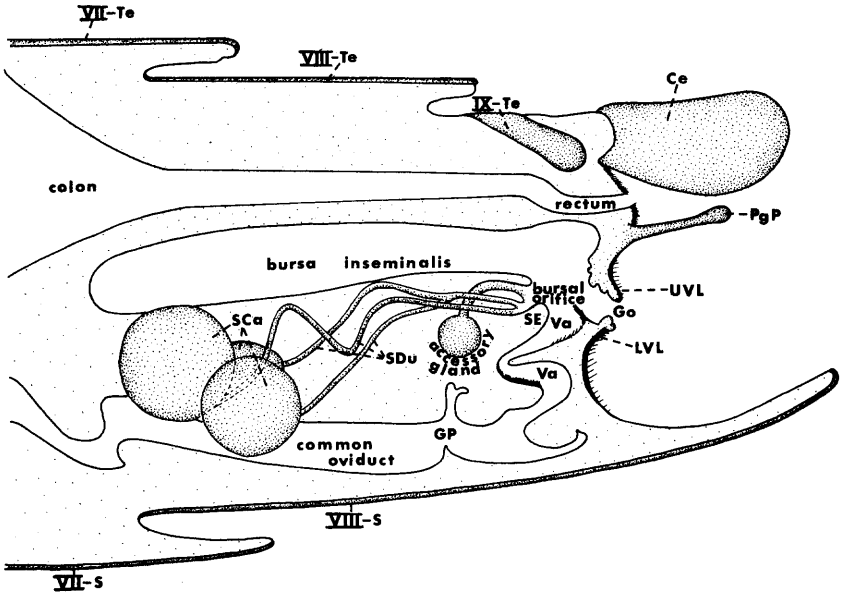
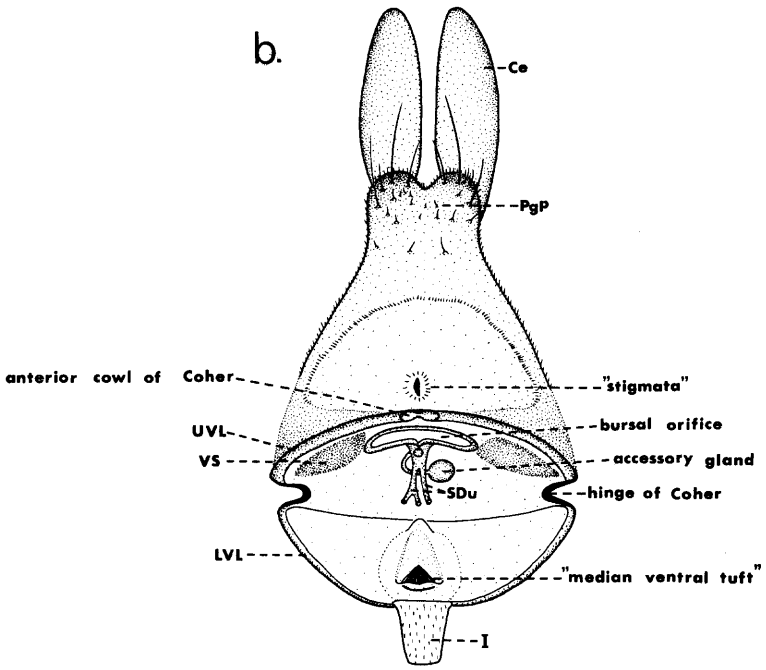

a.
VII-Te
VIII-Te
0.3mm
Ce
PgP
VII-S
Spt
VIII-S
b.
VII-Te
VIII-Te
IX-Te
Ce
PgP
Go
LVL
I
Va
VIII-S
Spt
VII-S
0.3mm
c.
Ce
PgP
UVL
Va
VS
LVL
I
0.1mm
d.
Ce
PgP
0.2mm
UVL
Va
LVL
e.
Ce
PgP
0.2mm
UVL
Va
VS
LVL

Fig. 32

a.


VII-Te
VIII-Te
IX-Te
Ce
colon
rectum
PgP
bursa inseminalis
bursal orifice
UVL
SCa
SE
Va
Go
LVL
SDu
accessory gland
Va
common oviduct
GP
VIII-S
VII-S

b.


Ce
PgP
anterior cowl of Coher
"stigmata"
UVL
bursal orifice
VS
accessory gland
SDu
hinge of Coher
LVL
"median ventral tuft"
I

APPENDIX

As pointed out in a previous issue, this section is appended for the purpose of explaining the recommendation of terms not presently widely accepted for use with Culicidae, or for their use in a different way.

cowl - Christophers (1923, 702-704) introduced this term. His description of the structure was rather vague and led to different interpretations of the term. He regarded the cowl as the bent anterior edge of the postgenital plate and indicated it to be sclerotized in some culicids but not in others. Actually this area is always at least weakly sclerotized in adult mosquitoes. Gerry (1932, 48-49) restricted postgenital plate to the structure we call the posterior lobe, using the term postgenital plate for this area both in cases in which, as in mosquitoes, the cuticle is sclerotized and in which it is membranous. He called the venter of segment 10 the cowl and the cowl of Christophers the ninth sternite. Edwards (1941, 19) thought he was applying cowl in a more restricted sense than had Christophers and used the term for the "sclerotized posterior rim of the atrium." We believe Edwards thus applied the word to the same part Christophers referred to, though Christophers had thought the rim was sometimes not sclerotized. Christophers (1960, 464) used cowl in the same sense as Edwards did. Coher (1948, 81-82) termed Gerry's cowl the posterior cowl and called a restricted median part of Christophers' cowl the anterior cowl. In view of the conflicting applications, we advise against the use of cowl as a valid term.

median ventral tuft - Applied by Jones and Wheeler (1965, fig. 2C) to a small tuft of bristles occurring on the medial line just inside the lower vaginal lip of A. aegypti.

SPERMATHECA - Most Diptera taxonomists have used spermatheca for the seminal capsule only. On the other hand, those morphologists who have studied the internal female genitalia have commonly used spermatheca (or its equivalents, receptaculum seminis and seminal receptacle) for the entire caecum, including the spermathecal gland, seminal capsule and spermathecal duct when these are differentiated as parts of the spermatheca (von Siebold, 1837; Loew, 1841a and 1841b; Heberdey, 1931; Weber, 1933; Bonhag, 1951; Dupuis, 1955 and 1970; Muhlenberg, 1970). Some authors (including Snodgrass 1933 and 1935, Tuxen 1960) either use the term in both senses or do not make it clear if they include the spermathecal duct as a part of the spermatheca. In some insects the caecum is not differentiated into well-marked areas and spermatheca (or receptaculum seminis) has been used for the entire structure. The term capsula seminalis has been applied to the terminal differentiated seminal storage area at least since 1837 and the English equivalent, seminal capsule, has had some use. We strongly recommend against the continued use of the term spermatheca for only one part of the receptaculum seminis or spermatheca of morphologists. Bonhag (1951) considered the three ducts and their three terminal bulbous enlargements in Tabanus sulcifrons as collectively comprising only one spermatheca. We agree that there are arguments to support this view, but we feel that for various reasons, including convenience of reference and precedence, Bonhag's practice should not be adopted."

stigmata - Applied by Jones and Wheeler (1965, fig. 2A) to an ovoid brown-pigmented area occurring basoventrally on the postgenital lobe of A. aegypti. The significance of this structure is not known.

VAGINA - This pouch has usually been called the atrium in mosquitoes, but the mosquito structure is equivalent to the vagina or genital chamber of other insects. All three terms have previously been used for the structure in mosquitoes and we see no good reason for calling it atrium in mosquitoes while calling it vagina or genital chamber in other insects. Snodgrass (1933) defined genital chamber in the broad sense in which we use vagina; he applied the term vagina only to the type of genital chamber in which the pouch was quite tubular and the posterior opening narrow. We consider the distinction impractical and recommend that it be called vagina without regard to whether it is broadly or narrowly open and tubular or otherwise developed. The common oviduct of most insects is also mainly or entirely an ectodermal tube derived from segment 8. The theoretical boundary between it and the vagina is often called the gonopore, though the terminal openings of other gonoducts are also called gonopores. We do not know any practical criterion for distinguishing between the vagina and common oviduct that can be applied to all insects that are said to have both.

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